Notes on Two *Nysius* Species Accidentally Introduced into Hawaii (Hemiptera: Lygaeidae: Orsillinae)[1]

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The orsilline Lygaeidae constitute one of the more thoroughly studied groups of Hawaiian Heteroptera (Ashlock, 1966; Usinger, 1942; Zimmerman, 1948), and *Nysius* Dallas is one of the few genera containing endemic Hawaiian species which have successfully adapted to exotic host plants in disturbed lowland ecosystems. At the time they were treated by Usinger (1942) and Zimmerman (1948) all of the known Hawaiian *Nysius* were believed to be endemic. However, during recent years two foreign *Nysius* species have become established on the main Hawaiian Islands (Beardsley, 1965a, 1971) and a third was discovered on Laysan Island in the Leeward group (Ashlock, 1963). On Oahu, the two recently adventive species have become abundant in many lowland areas where they occupy the same hosts as certain presumably endemic forms. Furthermore, from observations which I have made over the past ten years, it appears that these exotic *Nysius* may be displacing their endemic counterparts, at least in lowland areas on Oahu.

Nysius species often develop large populations on various common herbaceous weeds, particularly those of the families Amaranthaceae, Chenopodiaceae, Compositae, Euphorbiaceae and Portulacaceae. When these wild hosts dry up, large numbers of these bugs may move onto nearby crop and ornamental plants, and sometimes cause economic injury. Several such occurrences have been reported in Hawaii. Holdaway (1944) for example, listed *Nysius nemorivagus* White as an occasional pest of Chinese cabbage and potatoes, and *N. coenosulus* Stål (under the synonym *N. nigriscutellatus* Usinger) as an occasional pest of beets and potatoes. Both *N. kinbergi* Usinger and *N. caledoniae* Distant have damaged commercial plantings of vanda orchids on Hawaii (Beardsley, 1965b; Yoshioka, 1965).

The purpose of the present paper is to furnish host and distribution information on the two adventive species now known to be established in the main Hawaiian Islands, and to provide additions to existing keys to Hawaiian *Nysius* species which will facilitate their identification.

As pointed out elsewhere (Beardsley, 1978), the published keys to Hawaiian *Nysius* spp. rely heavily on the relative length of the labium, a character which may give difficulty in certain species. For example, the differences in labial length between *N. coenosulus* Stål and *N. terrestris* Usinger are very slight, yet the Usinger and Zimmerman keys use this as the primary character to separate *coenosulus* (there treated under its synonym, *N. nigriscutellatus* Usinger) from all of the other short-headed species of Hawaiian *Nysius*, including *N. terrestris*. In order to overcome this difficulty the following recasting of couplet 7 of the Usinger key to the *Nysius* species of the main Hawaiian Islands (Usinger, 1942, p. 86) is offered.

[1]Published with the approval of the Director, Hawaii Agricultural Experiment Station as Journal Series No. 2244.

7. Labium relatively short, ending between the middle coxae when extended flat on venter, not reaching apex of flat part of metasternum; costal margin of hemelytron not expanded, curve of costal margin relatively smooth, only slightly divergent at about one-fifth distance from base (fig. 1A); head relatively short (anteocular distance 1.0-1.2 times as long as eye), with a narrow, usually interrupted, longitudinal fulvous stripe; legs generally fulvous with dark spots; membrane of hemelytron largely immaculate or only faintly infuscate ..... *coenosulus*
Labium usually conspicuously longer, usually extending to posterior coxae or beyond, usually attaining or exceeding apex of flat part of metasternum; other characters not in above combination; *if* labium short (*terrestris*), *then* costal margin of hemelytron more strongly expanded, the curve conspicuously divergent at about one fifth distance from base (fig. 1B), head with a broad uninterrupted fulvous stripe and membrane of hemelytron definitely, irregularly infuscate 8

As a further correction to Usinger's key in couplet 15, p. 87, replace the name *"Nysius coenosulus"* with *Nysius kinbergi*. This name was proposed by Usinger (1959) to correct his earlier misidentification of *N. coenosulus*.

Taxonomic and Collection Notes

Nysius caledoniae Distant.

Nysius caledoniae Distant, 1920. Ann. Mag. Nat. Hist. IX, 6:151; Barber, 1958, Ins. Micronesia 7(4):181; Ashlock, 1966, Pacific Insects 8:824.

This species was first found to be established on Oahu in April 1964 (Beardsley, 1965a), and subsequently on Hawaii (Yoshioka, 1965) and Lanai (Ashlock, 1966). It is rather similar to the very common *N. coenosulus* Stål in size and general coloration, although the labium is longer, normally extending onto the first visible abdominal ventrite. It can be separated readily from all other Hawaiian *Nysius* (including *coenosulus*) by the form of the bucculae, as illustrated by Ashlock (1966) (fig. 2). Ashlock provided the following addition, to be inserted before the first couplet in the keys of Usinger (1942) and Zimmerman (1948), which will distinguish it.

1! Buccula somewhat tapering posteriorly, but ending abruptly before base of head (fig. 2A) ..... *N. caledoniae*
Buccula tapering posteriorly, gradually disappearing into underside of head, not ending abruptly (fig. 2B) 1

Hosts. In Hawaii *Nysius caledoniae* has been found associated primarily with certain weeds of the family Compositae. Both nymphs and adults have been collected from *Emilia sonchifolia, Erigeron canadensis, Pluchea indica, Pluchea odorata* and *Sonchus oleraceus*. Adults have been found on many kinds of plants, and in one instance were reported damaging buds and blossoms of vanda orchids (Yoshioka, 1965).

Nysius sp. near **vinitor** Bergroth.

Nysius sp., Beardsley, 1971, Proc. Hawaii. Entomol. Soc. 21:12.

This species, which is now possibly the most abundant *Nysius* in lowland areas of Oahu, was discovered on that island in April 1970 (Beardsley, 1971). It was also

found in light trap material from Hilo, Hawaii during October 1976. Oahu specimens appear to be the same as Micronesian material in the Bishop Museum determined as *N. vinitor* by Barber (see Barber, 1958). However, Dr. P. D. Ashlock (personal communication) has indicated his belief that more than one species may presently be confused under this name, and, until this confusion has been resolved, our species must remain incompletely determined. Specimens of this *Nysius* will run to couplet 12 in the keys of Usinger (1942) and Zimmerman (1948). This size range (♂♂ 3.5 to 4 mm, ♀♀ 4-4.5 mm long) is closest to that of *terrestris* Usinger, but the paler coloration and relatively weak expansion of the costal margin of the hemelytron will distinguish it from that species. Among other Hawaiian *Nysius* it is perhaps most similar to *N. dallasi* White. It can be separated from *dallasi* by the larger size of the latter (♂♂ 4.5-5.0 mm, ♀♀ 5.5-6.0 mm long, based on 3 ♂♂ and 4 ♀♀), and (in sp. near *vinitor*) the more strongly developed hemelytral markings, and relatively inconspicuous dorsal pubescence. This species normally has two short, thick, black, dash marks on the posterior margin of the corium, whereas, in *dallasi*, only narrow, linear testaceous marks are evident in this region. It also frequently has a few other small black dash marks or sports present on the corial veins which are lacking in *dallasi*, and the hemelytra are relatively transparent, with veins mostly opaque white, except for the few blackish markings. The dorsal pubescence is very short, fine and appressed. In *dallasi* the pubescence is more conspicuous, with numerous longer erect hairs present in addition to subappressed setae.

The following modifications of the keys of Usinger and Zimmerman are necessary to permit inclusion of this species. Couplet 12 is completley revised and couplet 13! is added.

12 Smaller species, length 4.0 mm or less in males, 4.5 mm or less in females ..... 13!

\- Larger species, length greater than 4.2 mm in males, greater than 4.7 mm in females 13

13! Costal margin of hemelytron relatively strongly expanded, conspicuously divergent at about one-fifth of the distance between base and apex (fig. 1B); hemelytron, including membrane, fuscomaculate, markings not confined to veins ..... *N. terrestris*

\- Costal margin of hemelytron relatively weakly expanded, not conspicuously divergent at one-fifth distance between base and apex (fig. 1C), hemelytron largely pale, membrane without markings, dark markings confined to corial veins ..... *N.* sp. nr. *vinitor*

Hosts. Adults and nymphs of this species have been collected from *Amaranthus spinosus*, *A. retroflexus*, *Euphorbia hirta* and *Portulacca oleracea*. Adults were also taken damaging vanda orchid flowers at Waimanalo, Oahu during July, 1970 (Beardsley, unpublished).

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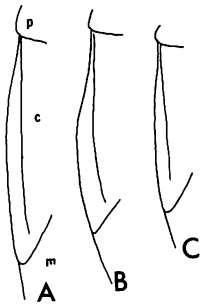

FIG. 1. Sketches comparing margins of left hemelytra of A, *Nysius coenosulus;* B, *N. terestris* and C, *N.* sp. near *vinitor* (p=pronotum, c=corium, m=membrane). Drawings based on female specimens, all to same scale.

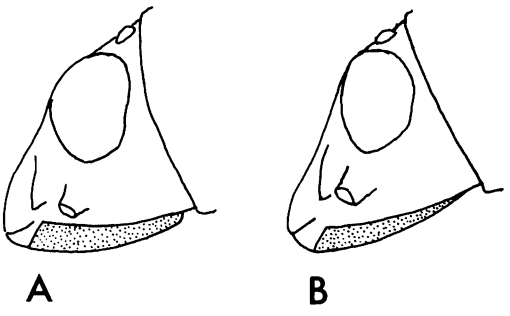

FIG. 2. Lateral aspect of head of A, *Nysius caledoniae* and B, *N. coenosulus,* to compare form of buccalae (stippled area).